

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : Kazutaka Inukai et al. Art Unit : Unknown
Serial No. : Unassigned Examiner : Unknown
Filed : September 4, 2001
Title : METHOD OF DRIVING EL DISPLAY DEVICE

Commissioner for Patents
Washington, D.C. 20231

PRELIMINARY AMENDMENT

Prior to examination, please amend the application as follows:

In the claims:

Amend claims 1, 4, 5, 8, 9, 12, 13, 16, 17, 20, 21 and 24 as follows:

1. (Amended) A method of driving an EL display device including a plurality of pixels, each having a first TFT, a second TFT, a third TFT, and an organic EL element, the method comprising:

dividing a frame period into $n + m$ display periods (where n and m are both natural numbers), wherein the $n + m$ display periods each correspond to one bit of a digital video signal among n bits of the digital video signal, a plurality of display periods, among the $n + m$ display periods correspond to the same bit of the digital video signal, and other display periods corresponding to other bits of the digital video signal, among the $n + m$ display periods, appear between the plurality of display periods;

for each of the $n + m$ display periods, inputting the corresponding bit of the digital video signal to a gate electrode of the second TFT by turning on the first TFT and beginning the respective display period by turning off the third TFT; and

after each of the $n + m$ display periods begins, completing the respective display period by beginning another display period or by turning on the third TFT;

wherein the organic EL element emits light when the second TFT is turned on, and does not emit light when the second TFT is turned off.

4. (Amended) A method according to claim 1, wherein the first TFT functions as a switching TFT, the second TFT functions as an EL driver TFT, and the third TFT functions as an erasing TFT.

5. (Amended) A method of driving an EL display device including a plurality of pixels, each having a first TFT, a second TFT, a third TFT, and an organic EL element, the method comprising:

dividing the frame period into $n + m$ display periods (where n and m are both natural numbers), wherein the $n + m$ display periods each correspond to one bit of a digital video signal among n bits of the digital video signal, a plurality of display periods, among the $n + m$ display period correspond to the most significant bit of the digital video signal, and other display periods corresponding to other bits of the digital video signal, among the $n + m$ display periods, appear between the plurality of display periods;

for each of the $n + m$ display periods, inputting the corresponding bit of the digital video signal to a gate electrode of the second TFT by turning on the first TFT and beginning the respective display period by turning off the third TFT; and

after each of the $n + m$ display periods begins, completing the respective display period by beginning another display period or by turning on the third TFT;

wherein the organic EL element emits light when the second TFT is turned on, and does not emit light when the second TFT is turned off.

8. (Amended) A method according to claim 5, wherein the first TFT functions as a switching TFT, the second TFT functions as an EL driver TFT, and the third TFT functions as an erasing TFT.

9. (Amended) A method of driving an EL display device including a plurality of pixels, each having a first TFT, a second TFT, a third TFT, and an organic EL element, the method comprising: .

dividing a frame period into $n + m$ display periods (where n and m are both natural numbers), wherein the $n + m$ display periods each correspond to one bit of a digital video signal among n bits of the digital video signal, upper bits of the digital video signal correspond to a plurality of display periods among the $n + m$ display periods, and other display periods corresponding to other bits of the digital video signal, among the $n + m$ display periods, appear between the plurality of display periods;

for each of the $n + m$ display periods, inputting the corresponding bit of the digital video signal to a gate electrode of the second TFT by turning on the first TFT and beginning the respective display period by turning off the third TFT; and

after each of the $n + m$ display periods begins, completing the respective display period by beginning another display period, or by turning on the third TFT;

wherein the organic EL element emits light when the second TFT is turned on, and does not emit light when the second TFT is turned off.

12. (Amended) A method according to claim 9, wherein the first TFT functions as a switching TFT, the second TFT functions as an EL driver TFT and the third TFT functions as an erasing TFT.

13. (Amended) A method of driving an EL display device including a plurality of pixels, each having a first TFT, a second TFT and an organic EL element, the method comprising:

dividing a frame period into $n + m$ display periods (where n and m are both natural numbers), wherein the $n + m$ display periods each correspond to one bit of a digital video signal among n bits of the digital video signal, a plurality of display periods, among the $n + m$ display periods, correspond to the same bit of the digital video signal, and other display periods corresponding to other bits of the digital video signal, among the $n + m$ display periods, appear between the plurality of display periods;

for each of the $n + m$ display periods, inputting the corresponding bit of the digital video signal to a gate electrode of the second TFT by turning on the first TFT; and

after each of the $n + m$ display periods begins, completing the respective display period by beginning another display period;

wherein the organic EL element emits light when the second TFT is turned on, and does not emit light when the second TFT is turned off.

16. (Amended) A method according to claim 13, wherein the first TFT functions as a switching TFT and the second TFT functions as an EL driver TFT.

17. (Amended) A method of driving an EL display device including a plurality of pixels, each having a first TFT, a second TFT, and an organic EL element, the method comprising:

dividing a frame period into $n + m$ display periods (where n and m are both natural numbers), wherein the $n + m$ display periods each correspond to one bit of a digital video signal among n bits of the digital video signal, a plurality of display periods, among the $n + m$ display periods, correspond to the most significant bit of the digital video signal, and other display periods corresponding to other bits of the digital video signal, among the $n + m$ display periods, appear between the plurality of display periods;

for each of the $n + m$ display periods, inputting the corresponding bit of the digital video signal to a gate electrode of the second TFT by turning on the first TFT; and

after each of the $n + m$ display periods begins, completing the respective display period by beginning of another display period;

wherein the organic EL element emits light when the second TFT is turned on and does not emit light when the second TFT is turned off.

20. (Amended) A method according to claim 17, wherein the first TFT functions as a switching TFT and the second TFT functions as an EL driver TFT.

21. (Amended) A method of driving an EL display device including a plurality of pixels, each having a first TFT, a second TFT, and an organic EL element, the method comprising:

dividing a frame period into $n + m$ display periods (where n and m are both natural numbers), wherein the $n + m$ display periods each correspond to one bit of a digital video signal among n bits of the digital video signal, upper bits of the digital video signal correspond to a plurality of display periods among the $n + m$ display periods, and other display periods corresponding to other bits of the digital video signal, among the $n + m$ display periods, appear between the plurality of display periods;

for each of the $n + m$ display periods, inputting the corresponding bit of the digital video signal to a gate electrode of the second TFT by turning on the first TFT; and

after each of the $n + m$ display periods begins completing the respective display period by beginning another display period;

wherein the organic EL element emits light when the second TFT is turned on and does not emit light when the second TFT is turned off.

24. (Amended) A method according to claim 21, wherein the first TFT functions as a switching TFT and the second TFT functions as an EL driver TFT.

REMARKS

The amendments to the claims made herein are to correct minor grammatical errors and to place the application in better form for examination. No new matter is added.

Attached is a marked-up version of the changes being made by the current amendment.

Applicants ask that all claims be examined. Please apply any charges or credits to Deposit Account No. 06-1050.

Respectfully submitted,

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Version with markings to show changes made

In the claims:

Claims 1, 4, 5, 8, 9, 12, 13, 16, 17, 20, 21 and 24 have been amended as follows:

1. (Amended) A method of driving an EL display device **[in which]** including a plurality of pixels, each having a first TFT, a second TFT, a third TFT, and an organic EL element, **[are formed, wherein]** the method comprising:

dividing a frame period into $n + m$ display periods (where n and m are both natural numbers) **[appear in one frame period;],** wherein the $n + m$ display periods each correspond to one bit of a digital video signal among n bits of the digital video signal[;], a plurality of display periods, among the $n + m$ display periods correspond to the same bit of the digital video signal[;], and other display periods corresponding to other bits of the digital video signal, among the $n + m$ display periods, appear between the plurality of display periods;

for each of the $n + m$ display periods, inputting the corresponding bit of the digital video signal **[is input]** to a gate electrode of the second TFT by turning on the first TFT **[turning on,]** and beginning the respective display **[periods begin] period** by turning off the third TFT **[turning off]; and**

after each of the $n + m$ display periods begins, completing the respective display **[periods are completed] period** by **[the]** beginning **[of]** another display period[,]

 or by turning on the third TFT **[turning on; and];**

wherein the organic EL element emits light when the second TFT is turned on, and does not emit light when the second TFT is turned off.

4. (Amended) A method according to claim 1, wherein the first TFT functions as a switching TFT, the second TFT functions as **[a]** an EL driver TFT, and the third TFT functions as **[a]** an erasing TFT.

5. (Amended) A method of driving an EL display device **[in which]** including a plurality of pixels, each having a first TFT, a second TFT, a third TFT, and an organic EL element, **[are formed, wherein]** the method comprising:

dividing a frame period into $n + m$ display periods (where n and m are both natural numbers), **[appear in one frame period;]** wherein the $n + m$ display periods each correspond to one bit of a digital video signal among n bits of the digital video signal[;], a plurality of display periods, among the $n + m$ display period correspond to the most significant bit of the digital video signal[;], and other display periods corresponding to other bits of the digital video signal, among the $n + m$ display periods, appear between the plurality of display periods;

for each of the $n + m$ display periods, inputting the corresponding bit of the digital video signal **[is input]** to a gate electrode of the second TFT by turning on the first TFT **[turning on,]** and beginning the respective display **[periods begin]** period by turning off the third TFT **[turning off:]; and**

after each of the $n + m$ display periods begins, completing the respective display **[periods are completed]** period by **[the]** beginning **[of]** another display period[, or by turning on the third TFT **[turning on; and];**

wherein the organic EL element emits light when the second TFT is turned on, and does not emit light when the second TFT is turned off.

8. (Amended) A method according to claim 5, wherein the first TFT functions as a switching TFT, the second TFT functions as **[a]** an EL driver TFT, and the third TFT functions as **[a]** an erasing TFT.

9. (Amended) A method of driving an EL display device **[in which]** including a plurality of pixels, each having a first TFT, a second TFT, a third TFT, and an organic EL element, **[are formed wherein]]** the method comprising:

dividing a frame period into $n + m$ display periods (where n and m are both natural numbers), **[appear in one frame period;]** wherein the $n + m$ display periods each

correspond to one bit of a digital video signal among n bits of the digital video signal[;], upper bits of the digital video signal correspond to a plurality of display periods among the $n + m$ display periods[;], and other display periods corresponding to other bits of the digital video signal, among the $n + m$ display periods, appear between the plurality of display periods;

for each of the $n + m$ display periods, inputting the corresponding bit of the digital video signal [**is input**] to a gate electrode of the second TFT by turning on the first TFT [**turning on,**] and beginning the respective display [**periods begin**] period by turning off the third TFT [**turning off**]; and

after each of the $n + m$ display periods begins, completing the respective display [**periods are completed**] period by [**the**] beginning [**of**] another display period, or by turning on the third TFT [**turning on**]; [**and**]

wherein the organic EL element emits light when the second TFT is turned on, and does not emit light when the second TFT is turned off.

12. (Amended) A method according to claim 9, wherein the first TFT functions as a switching TFT, the second TFT functions as [**a**] an EL driver TFT and the third TFT functions as [**a**] an erasing TFT.

13. (Amended) A method of driving an EL display device [**in which**] including a plurality of pixels, each having a first TFT, a second TFT and an organic EL element [**are formed, wherein:**], the method comprising:

dividing a frame period into $n + m$ display periods (where n and m are both natural numbers), [**appear in one frame period;**] wherein the $n + m$ display periods each correspond to one bit of a digital video signal among n bits of the digital video signal[;], a plurality of display periods, among the $n + m$ display periods, correspond to the same bit of the digital video signal[;], and other display periods corresponding to other bits of the digital video signal, among the $n + m$ display periods, appear between the plurality of display periods;

for each of the $n + m$ display periods, inputting the corresponding bit of the digital video signal **[is input]** to a gate electrode of the second TFT by turning on the first TFT **[turning on]; and**

after each of the $n + m$ display periods begins, completing the respective display **[periods are completed]** period by **[the]** beginning **[of]** another display period; **[and]**

wherein the organic EL element emits light when the second TFT is turned on, and does not emit light when the second TFT is turned off.

16. (Amended) A method according to claim 13, wherein the first TFT functions as a switching TFT and the second TFT functions as **[a]** an EL driver TFT.

17. (Amended) A method of driving an EL display device **[in which]** including a plurality of pixels, each having a first TFT, a second TFT, and an organic EL element, **[are formed, wherein]** the method comprising:

dividing a frame period into $n + m$ display periods (where n and m are both natural numbers), wherein **[appear in one frame period;]** the $n + m$ display periods each correspond to one bit of a digital video signal among n bits of the digital video signal[;], a plurality of display periods, among the $n + m$ display periods, correspond to the most significant bit of the digital video signal[;], and other display periods corresponding to other bits of the digital video signal, among the $n + m$ display periods, appear between the plurality of display periods;

for each of the $n + m$ display periods, inputting the corresponding bit of the digital video signal **[is input]** to a gate electrode of the second TFT by turning on the first TFT **[turning on]; and**

after each of the $n + m$ display periods begins, completing the respective display **[periods are completed]** period by **[the]** beginning of another display period; **[and]**

wherein the organic EL element emits light when the second TFT is turned on, and does not emit light when the second TFT is turned off.

20. (Amended) A method according to claim 17, wherein the first TFT functions as a switching TFT and the second TFT functions as **[a] an** EL driver TFT.

21. (Amended) A method of driving an EL display device **[in which]** including a plurality of pixels, each having a first TFT, a second TFT, and an organic EL element, **[are formed, wherein]** the method comprising:

dividing a frame period into $n + m$ display periods (where n and m are both natural numbers) **[appear in one frame period];**, wherein the $n + m$ display periods each correspond to one bit of a digital video signal among n bits of the digital video signal[;], upper bits of the digital video signal correspond to a plurality of display periods among the $n + m$ display periods[;], and other display periods corresponding to other bits of the digital video signal, among the $n + m$ display periods, appear between the plurality of display periods;

for each of the $n + m$ display periods, inputting the corresponding bit of the digital video signal **[is input]** to a gate electrode of the second TFT by turning on the first TFT **[turning on]; and**

after each of the $n + m$ display periods begins completing the respective display **[periods are completed]** period by **[the]** beginning **[of]** another display period; **[and]**

wherein the organic EL element emits light when the second TFT is turned on and does not emit light when the second TFT is turned off.

24. (Amended) A method according to claim 21, wherein the first TFT functions as a switching TFT and the second TFT functions as **[a] an** EL driver TFT.